
Reviews/Analyses

National tuberculosis programme review: experience over the period 1990–95*

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Since 1990 the WHO Global Tuberculosis Programme (GTB) has promoted the revision of national tuberculosis programmes to strengthen the focus on directly observed treatment, short-course (DOTS) and close monitoring of treatment outcomes. GTB has encouraged in-depth evaluation of activities through a comprehensive programme review.

Over the period 1990–95, WHO supported 12 such programme reviews. The criteria for selection were as follows: large population (Bangladesh, Brazil, China, Ethiopia, India, Indonesia, Mexico, and Thailand); good prospects of developing a model programme for a region (Nepal, Zimbabwe); or at advanced stage of implementation of a model programme for a region (Guinea, Peru). The estimated combined incidence of smear-positive pulmonary tuberculosis was 82 per 100 000 population, about 43% of the global incidence. The prevalence of infection with human immunodeficiency virus (HIV) was variable, being very high in Ethiopia and Zimbabwe, but negligible in Bangladesh, China, Nepal and Peru.

The programme reviews were conducted by teams of 15–35 experts representing a wide range of national and external institutions. After a 2–3-month preparatory period, the conduct of the review usually lasted 2–3 weeks, including a first phase of meetings with authorities and review of documents, a second phase for field visits, and a third phase of discussion of findings and recommendations.

The main lessons learned from the programme reviews were as follows: programme review is a useful tool to secure government commitment, reorient the tuberculosis control policies and replan the activities on solid grounds; the involvement of public health and academic institutions, cooperating agencies, and nongovernmental organizations secured a broad support to the new policies; programme success is linked to a centralized direction which supports a decentralized implementation through the primary health care services; monitoring and evaluation of case management functions well if it is based on the right classification of cases and quarterly reports on cohorts of patients; a comprehensive programme review should include teaching about tuberculosis in medical, nursing, and laboratory workers' schools; good quality diagnosis and treatment are the essential requirements for expanding a programme beyond the pilot testing; and control targets cannot be achieved if private and social security patients are left outside the programme scope.

The methodology of comprehensive programme review should be recommended to all countries which require programme reorientation; it is also appropriate for carrying out evaluations at 4–5-year intervals in countries that are implementing the correct tuberculosis control policies.

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Introduction

Since 1990 the WHO Global Tuberculosis Programme (GTB) has promoted the revision of national tuberculosis programmes to strengthen focus on the following: passive case finding; directly observed treatment, short-course (DOTS); regular supply of drugs; and close monitoring of case

detection and treatment outcomes (1). Since then, GTB has encouraged in-depth evaluation of activities through a comprehensive programme review, which has the following objectives:

- to analyse the tuberculosis epidemiological situation, technical policies and programme structure;
- to evaluate programme activities, underscore achievements and identify problems;
- to assess leading issues facing the programme and their underlying causes; and
- to make recommendations on policy changes and a workplan to improve the programme's effectiveness.

Over the period 1990–95, WHO supported 12 programme reviews (Table 1). The first comprehensive assessments were conducted in conjunction with the World Bank in Bangladesh in 1990 (2), and China in 1991 (3). These two early experiences provided the field bases for developing a programme review methodology and producing a *Tuberculosis programme review manual* (4). In 1992 the manual was tested in Zimbabwe (5) and India (6) and a revised version was used in five countries in 1994 (7–11) and in three countries (12–14) in 1995.

The present review article presents an analysis of the GTB programme review experience, encompassing methodological aspects, main findings, recommended strategies and activities, immediate follow-up to the programme reviews, and lessons learned.

Table 1: Dates of national tuberculosis programme reviews and population in the 12 countries involved

	Country	Population in 1992 ($\times 10^6$) ^a
<i>Early reviews</i>		
September 1990	Bangladesh	119.3
June 1991	China	593.8 ^b
<i>Field testing of methodology</i>		
March 1992	Zimbabwe	10.6
September 1992	India	879.5
<i>Implementation of review projects</i>		
March 1994	Peru	22.5
April 1994	Indonesia	191.2
May 1994	Nepal	20.6
July 1994	Brazil	154.1
July 1994	Ethiopia	53.0
June 1995	Mexico	88.2
June 1995	Thailand	56.1
November 1995	Guinea	6.1
Total		2195.0

^a Data from: *World population 1992*. New York, United Nations Population Division, 1992.

^b The review in China was limited to 12 provinces (1222 districts) corresponding to about 50% of the total Chinese population.

Selection of countries

In general, the decision to undertake a programme review was reached by a common agreement between the country concerned and WHO and other cooperating agencies, either because the national authorities became aware of the failure of past control efforts or because they felt the need to assess the programme situation with external experts.

The following were the criteria for selecting countries:

- large population (eight of the most populated countries in the world: Bangladesh, Brazil, China, Ethiopia, India, Indonesia, Mexico and Thailand); or
- good prospects of developing a model programme for a region (Nepal for South-east Asia and Zimbabwe for anglophone Africa); or
- countries at an advanced stage of implementing a model programme for a region (Guinea for francophone Africa and Peru for Latin America).

The combined population of the 12 countries totalled 2195 million (1992 estimates), almost 50% of the total for the developing world.

Government commitment and high likelihood of achieving and sustaining the programme's success were features common to all the countries selected. In addition, the countries selected had high rates of tuberculosis infection and morbidity (Table 2). The estimated annual rate of tuberculosis infection (ARTI) ranged from 0.8% to 2.0%, with the estimated average incidence of bacteriological smear-positive cases being 82 per 100 000 population, i.e. around 1.7 million cases a year. These data represent 43% of the total estimated global incidence of 4 million bacteriological smear-positive cases of tuberculosis (15), India alone contributes 22%, and China (based only on 50% of its population) contributes 8%.

The prevalence of human immunodeficiency virus (HIV) infection was not a constant factor in the countries selected. Table 2 shows that although the prevalence of HIV-positivity among tuberculosis patients was very high in Ethiopia and Zimbabwe, it was still very low in Bangladesh, China, Nepal and Peru, and was on the increase in India, Indonesia, and Mexico.

Programme review methodology

The programme reviews were conducted by teams of 15–35 experts representing a wide range of nation-

Table 2: Estimated annual tuberculosis infection and morbidity in 12 programme review countries, 1990–95

Country	Population ($\times 10^6$)	ARTI ^a (%)	Incidence of smear-positive cases		HIV positivity among TB cases
			Rate (per 100 000)	<i>n</i>	
Bangladesh	119.3	1.0–1.5	75	85 000	Negligible
Brazil	154.1	0.8	40	60 000	5–10%
China ^b	593.8	1.2	60	332 000	Negligible
Ethiopia	53.0	1.4	77	41 500	45%, Addis Ababa
Guinea	6.1	1.5	70	4 500	6%, Conakry
India	879.5	1.0–2.0	102	860 000	Increasing
Indonesia	191.2	2.0	105	205 000	Increasing
Mexico	88.2	0.5	25	22 500	3.0%, males
					1.7%, females
Nepal	20.6	2.0 (rural)	100	27 600	Negligible
		4.5 (urban)	200		
Peru	22.5	1.5–2.5	125	27 600	Negligible
Thailand	56.1	1.5	75	45 000	10%
Zimbabwe	10.6	0.8	125	12 000	40–60%
Total	2195.0	1.3	82	1 722 700	

^a Annual rate of tuberculosis infection.

^b The review in China was limited to 12 provinces comprising about 50% of the country's total population.

al institutions, external cooperating agencies, and nongovernmental organizations. Bringing large numbers of external reviewers into the country and involving an even larger number of nationals in the programme review required a complex and expensive organizational effort.

The programme review provided an opportunity to expose a large number of individuals to a rich learning experience based on the direct observation of the realities of programme delivery and interaction with international experts.

A 2–3 month preparatory period (Table 3) was needed to formulate the objectives and scope, nominate review team members, compile documents for use by the team, select districts and health facilities for the field visits, adapt WHO questionnaires, determine logistic needs, and estimate budgets.

Typically, the programme review lasted 2–3 weeks and included meetings with authorities and review of documents at central level (phase I); field visits (phase II); and discussion of findings, identification of priority issues, and development of recommendations (phase III). The review usually ended with the presentation of a summary report to the Ministry of Health authorities.

With the exception of small countries, such as Guinea, the visits covered only some health facilities. However, the total numbers of facilities in each country were substantial (at least 25), with the exception of Bangladesh (11 health facilities), where the review team was rather small and the duration of the survey was only 9 days. Generally no random procedures were used to select regions, districts, and

health facilities to be visited; however, the data obtained were enough to meet the purposes of the review. Since the sample sizes were not estimated statistically, the quantitative findings on programme indicators (e.g. rates of treatment cure or proportion of health facilities providing correct tuberculosis treatment) cannot be taken as accurate baseline information for future evaluation of the progress of the

Table 3: Programme review phases

Phase	Duration	Activities
Preparatory	2–3 months	Setting objectives Nominating team Listing documents Adapting forms Planning field visits Logistical needs Budget estimates
Phase I	2–4 days	Meetings at central level Visit to central level institutions Review of documents
Phase II	5–10 days	Field visits to: health offices, health facilities, laboratories, and other institutions
Phase III	3–5 days	Discussion of findings Analysis of achievements and constraints, identification of priority issues, conclusions, and recommendations

programme. Different methodologies, such as health facility surveys and population-based surveys, should be used to measure accurately some programme indicators and determine within statistical confidence limits the progress towards the achievement of programme targets.

Review of programmes requiring overall revision of policies and re-organization

In the following countries, the programme required substantial changes in policies and organization: Bangladesh, Brazil, China, Ethiopia, India, Indonesia, Mexico, Nepal, Thailand, and Zimbabwe. All these countries had been implementing tuberculosis programmes for many years and some achievements could be documented; however, in general, the effectiveness was low due to inadequate technical policies and management deficiencies.

Programme review findings

The problems identified in the review of these countries were consolidated into the 10 major areas shown below.

Dominance of specialized services in programme delivery. The participation of primary health structures in case finding and treatment was minimal. In many countries, diagnosis and treatment activities were almost completely carried out by tuberculosis or chest clinics in large towns. Centralization of tuberculosis activities increased the distance between patients and accessible care and reduced the probabilities of treatment completion and cure.

Disparate tuberculosis policies co-existed within the same country. Although all countries had issued policies and manuals in the past (generally not adequate enough to achieve the objectives of tuberculosis control), they were assumed to be valid only for government health facilities. Even within such facilities, however, there was a great variation in policies between provinces or states, between the Ministry of Health and social security services, and between different departments of the Ministry of Health. With very few exceptions, no serious attempts were made to include the private sector in the national tuberculosis programme.

Excessive emphasis on case detection to the detriment of case holding. Although in theory this policy was supported by sound epidemiological considera-

tions, in practice the results led to a worsening of the tuberculosis problem because no attention was given to ensuring that a high proportion of identified cases were treated and cured. The policy of setting annual case-finding targets to each health unit (e.g. Indonesia and Nepal) resulted in over- or underdiagnosis of cases prompted by the concern to adjust performance to the targets.

Over-rating the value of radiological and clinical criteria for diagnosis. High proportions of tuberculosis pulmonary cases were reported without bacteriological confirmation; 60% in China, 80% in India, 75–80% in Nepal, 70–80% in Thailand, and more than 50% in Bangladesh and Ethiopia. In many places, only one sputum sample (instead of three) was requested for diagnostic investigation. In Brazil, there had been a 50% reduction in the number of diagnostic smear examinations in recent years and a concomitant growing number of cases diagnosed on the basis of radiological findings alone.

Microscopy was often unreliable. Microscopy quality control was irregular, insufficient, or simply nonexistent. In many places, poor microscopy techniques were common, mostly because of lack of training and supervision of technicians. Cold staining was still used in many areas, especially in Indonesia. Monocular microscopes of inadequate optical and mechanical quality were still in use in China, India, and Indonesia. In other countries, maintenance of binocular microscopes was often problematic. Shortages of laboratory supplies and sputum containers were frequent.

Low compliance rates with tuberculosis chemotherapy. With the exception of Zimbabwe during the initial treatment phase, no direct observation of drug intake had been organized. Self-administered treatment was an important cause of treatment failures. Cure rates (including completed treatment without bacteriological control) were less than 50% almost everywhere. The defaulter rates varied from 30% to 50%. In contrast, cure rates of $\geq 80\%$ were reported by all the pilot areas and health units that used DOTS in Ethiopia, Nepal, and Thailand.

Frequent shortages of tuberculosis drugs. Many patients were not cured because they had no access to free drugs. Shortages of tuberculosis drugs were frequent in some countries due to shortfalls in funding, delays in procurement, mismanagement of storage, and maldistribution. In China, the barrier was not the availability but the cost of drugs for individual patients. For uninsured patients, the high cost of treatment for tuberculosis led many either to never

start treatment or discontinue it once symptoms had disappeared, but before cure had been achieved. No drug shortages were reported in the last few years in Brazil, Indonesia, Nepal, and Thailand.

Information systems unrelated to monitoring and evaluation needs. Every programme had an information system and every programme, with the exception of Brazil, had no data to monitor essential programme activities such as treatment outcomes and utilization of tuberculosis drugs. Brazil was the only country where the health facilities reported the outcomes of treatment by cohort of patients. Data were consolidated and analysed at state level, without providing any feedback to the reporting health facilities. In the other 11 countries no regular system for monitoring treatment results in cohorts of patients was in place, with the exception of a few pilot areas testing DOTS.

Neglect of essential managerial functions. Programme management failed to ensure proper diagnosis and treatment of cases. Management through isolated activities was ineffective at delivering good quality diagnostic and treatment services either in countries where central management existed or in those with decentralized managerial and budgetary functions. Programme management failed to increase the access of patients to modern treatment technology; programme management also failed to motivate patients to use properly modern technology when it was made available.

Reversal or slow-down of a previously declining tuberculosis trend. The most important factor that may have had an adverse effect on the trend of the risk of infection was the pool of persistent and chronic smear-positive cases of pulmonary tuberculosis. Almost all countries have reported a growing pool of such cases due to a wide range of problems in treatment for many years. Where recent information is available, the prevalence of primary drug resistance (in most cases the data refer to initial rather than primary resistance) has shown an upward trend, with the possible exception of Brazil. Another complicating factor is the epidemic of HIV infection, in particular in Ethiopia and Zimbabwe, and this may have also somewhat influenced the risk of infection in Brazil, Mexico, and Thailand.

Programme review recommendations

The recommendations made to the 10 countries that needed either to revise key control policies or an overall reorganization are shown below:

- There should be a strong *government commitment* attaching high priority to the tuberculosis problem and recognizing tuberculosis control as one of the most cost-effective interventions.
- The *technical emphasis* of the revised programmes should be on curing cases rather than case finding; directly observed rather than self-administered treatment; smear-positive rather than radiologically positive pulmonary tuberculosis; and passive rather than active case-finding.
- *Managerial approaches* should stress strong central leadership, decentralization of treatment services, training, microscopy, quality control, regular supply of free drugs, quarterly monitoring of treatment outcomes, and a phased implementation of the new policies.

The recommendations that were applicable to most of the reviewed programmes can be divided into 10 groups, as discussed below.

- *Group 1: Re-structuring programme organization and management* through strengthening and redefining central level functions, delegating responsibilities for implementation and monitoring to the intermediate and district levels, and involving the whole primary health care structure in case detection and treatment. Delegation of managerial responsibilities does not mean a weakening of the central level; on the contrary the programme review recommended that staff and resources be increased at the central level, in particular, in Bangladesh, Brazil, India, Mexico, and Nepal.
- *Group 2: Strengthening the managerial capacity* to organize training and supervision of different categories of personnel, ensure regular drug and laboratory supplies, provide guidance on communication activities, and conduct operational research. The recommendations placed considerable emphasis on drug logistics and the steps to ensure regular supply and quality control of drugs, in particular fixed drug combinations, were pointed out. The need to create reserve stocks for drugs was underscored in Brazil, Ethiopia, Indonesia, Mexico and Zimbabwe. In line with the programme priorities, the research recommendations focused on exploring ways to ensure successful DOTS (especially in rural areas), factors related to patients' treatment default, and problems related to management of the association between tuberculosis and HIV infection.
- *Group 3: Outlining the bases for sound workplans* that can be supported adequately by national and external funding. It was recommended that all countries use the information provided by the programme reviews in revising their technical and

operational policies to make them compatible with GTB guidelines. Countries were told that the revised policies had to be disseminated through manuals, training courses, and scientific meetings. Workplans to implement the revised policies had to be elaborated. A relatively complete workplan was included in the programme reviews of Bangladesh and China; blueprints for workplans were prepared during the programme review in Ethiopia, Indonesia, Nepal, Thailand and Zimbabwe; and Brazil, India and Mexico were instructed to develop their plans after the programme review.

- *Group 4: Organizing DOTS* to cure at least 85% of smear-positive cases of pulmonary tuberculosis. This was the overriding priority recommended to the ten programmes reviewed. Every effort was made to achieve a high cure rate before any expansion of case finding was undertaken. The recommendations specified the essential conditions to increase the probability of successful implementation of DOTS (regular supply of drugs, use of fixed drug combinations, free drugs and free follow-up examinations, follow-up of patients under treatment through use of microscopy, monitoring of treatment outcomes through district registers and quarterly reports, introduction of various mechanisms to trace defaulters, and decentralization of treatment services) since, in general, it was not feasible to hospitalize all smear-positive cases for direct observation of drug intake.

- *Group 5: Giving priority to passive case finding using microscopy* (examination of three sputum samples) among patients attending health facilities or consulting health practitioners. The recommendations therefore strongly discouraged active case-finding activities using radiology or tuberculin tests in China and microscopy in Indonesia as a screening method to identify tuberculosis among those with respiratory symptoms in the community.

- *Group 6: Ensuring good quality microscopy* for diagnosis and follow-up. A functional network of mycobacteriology laboratories linking central, intermediate and peripheral levels was needed to ensure training of microscopists, and microscopy quality control through direct and indirect supervision following WHO/International Union against Tuberculosis and Lung Disease (IUATLD) guidelines.

- *Group 7: Setting up an information system* designed as an instrument to monitor and evaluate notification of cases and treatment outcomes. The recommendations gave specific advice on the organization of a tuberculosis district register and quarterly reports of treatment outcomes by cohorts of

patients to all countries, with the exception of Brazil, where such a system already existed. This quarterly report was singled out as the backbone of the system to monitor achievement of the cure rate, i.e. the most important programmatic target. It was recommended that linkages be set up between case notification by health facilities and the tuberculosis laboratory registers.

- *Group 8: Promoting epidemiological surveillance* of mycobacterial drug resistance, as part of the WHO global surveillance system, was recommended for all programmes to evaluate the potential effectiveness of the standard antituberculosis chemotherapy. The systematic survey of tuberculosis patients with HIV infection was recommended in countries with a high or increasing prevalence of such infection to measure the trend of the association between the two infections, anticipate future tuberculosis morbidity, and relate the trend to the case fatality rates.

- *Group 9: Increasing institutional and programmatic linkages* with other divisions and programmes of the Ministry of Health to avoid counterproductive, duplicating activities. The support of influential institutions should be sought. The possibility of establishing national advisory committees to endorse the revised control policies and become their effective promoters was raised in some programme reviews. In most countries, the recommendations called for coordination between government health facilities and those run by external cooperation projects and nongovernmental organizations (NGOs) in implementing the national tuberculosis guidelines.

- *Group 10: Generating the involvement of the private sector* in the tuberculosis control efforts. In countries where a large proportion of tuberculosis patients is cared for by the private sector (Brazil, India, Indonesia, Mexico, Thailand), the programme review recommended undertaking activities in collaboration with professional associations to encourage private doctors and clinics to follow national guidelines on diagnosis and chemotherapy and to report cases and treatment outcomes.

Follow-up of the programme reviews

Government commitment was manifest and important steps for reorganization of the programmes were taken by the 10 countries as follows: strengthening the central tuberculosis unit and the provincial/state level through increased resources; organizing national seminars to review and promote the policies; issuing revised manuals on tuberculosis

control consistent with WHO policies; and elaborating workplans, including budgetary estimates, for 2–5-year periods.

Most workplans adopted a similar phased implementation approach, starting with demonstration areas for field-testing the procedures, in particular, methods for the application of DOTS to all patients and the recording/reporting system. In Brazil and Zimbabwe no demonstration areas were established; instead, the revised guidelines were introduced simultaneously in most states (Brazil) or provinces and city health services (Zimbabwe) with variable success.

The workplans were the main instrument for the national programmes to use to obtain the required funding from national and external sources. Tuberculosis was given high priority by the 10 ministries of health, and real increases in the national budget allocated to the programme generally resulted: India increased the federal budget for the tuberculosis programme from US\$ 3 million in 1992 to US\$ 18 million in 1996; in Brazil the new annual budget for tuberculosis amounted to US\$ 30 million, a 50% increase over previous years, and no external funds were required for implementing the plan of operations; and the Ministries of Health and other national institutions in Mexico and Thailand have committed themselves to providing the funds needed for implementing the plans.

The World Bank approved development loans to the programmes in Bangladesh (US\$ 27.3 million) and China (US\$ 54 million) and has pledged over US\$ 142 million to India, part of which was used to implement the programme's phase II. In addition, the Government of Sweden supported phase I, and the Governments of Denmark and United Kingdom supported phase II of the plan of operations of India. The Government of the Netherlands was the main

contributor to the revised programme in Ethiopia (US\$ 13 million), which was also assisted financially by the German Leprosy Relief Association and the Governments of Italy and Norway. Zimbabwe created a 2-year drug buffer stock with the aid of the Government of the Netherlands and the World Bank; these two bodies together with the Government of Denmark, provided funds for laboratory equipment and supplies, microscopy quality control, and surveillance of bacterial drug resistance. In Indonesia, support to demonstration areas in one province was given by two Dutch NGOs — the Royal Netherlands Tuberculosis Association and the Netherlands Leprosy Relief Association.

The results of DOTS in demonstration areas were encouraging, with 2–3-month conversion rates >80% and cure/completion rates >72% (Table 4). These results provided the bases for systematic expansion of the programmes. The speed of expansion was variable. The most rapid expansion took place in China, which covered a population of 574 million over a 4-year period. During a similar period in Bangladesh, expansion reached 40 million people, i.e. 35% of the whole country. In India, the revised programme covered 12 million people after 3 years of implementation. Revised programme expansion had not yet occurred in Ethiopia, Indonesia, Nepal, or Thailand.

Review of programmes requiring an evaluation of implementation of appropriate control policies

The programme review in Guinea and Peru evaluated the implementation of current WHO guidelines and approaches to tuberculosis control at a time

Table 4: Conversion rates after 2–3 months of chemotherapy and cure/completion treatment rates in demonstration or pilot areas

Country	2–3 months' conversion		Cure/completion	
	Date/No. of cases	Rate(%)	Date/No. of cases	Rate (%)
Bangladesh	Up to June 1995/5014	87	Up to March 1994/191	79
China	1991/333	90	1991/333	93
Ethiopia	1995/13 920	Arsi, 90 S. Shoa, 72	1994/1472	72
India	Up to Dec. 1995/8981	85	Up to 1995/1546	80
Indonesia	1993/Sulawesi, 1926 cases	90	1993/Sulawesi, 668 cases	93

when the programme had just been extended to the whole country. Despite the different socioeconomic situations both countries attained a remarkable degree of programme success.

In terms of qualitative *achievements*, both programmes were driven by a strong political commitment. A central tuberculosis unit was established for the first time in Guinea and strengthened in Peru. Full- or part-time tuberculosis coordinators were designated in each region/district in Guinea and in each health subregion in Peru. DOTS was introduced and sustained by a regular supply of drugs. The direct observation of drug administration was ensured for the initial 2-month phase in Guinea (8-month regimen) and for the full course of treatment in Peru (6-month regimen, intermittent in the second phase).

The major emphasis of diagnosis was laid on passive case-finding through microscopy. The expansion of the new control approach was concomitant with that of the laboratory network staffed by well-trained technicians in charge of sputum microscopy. Microscopy quality control was being expanded on solid grounds; in general, the errors regarding false-positive and false-negative microscopy results were less than 5%.

A brief overview of programme achievements in quantitative terms is shown in Table 5. The number of microscopy laboratories increased by 36% in Peru and by more than 300% in Guinea. The classification of cases put in relief the emphasis given to bacteriological diagnosis: 69% of all reported cases and 81–84% of pulmonary cases were bacteriologically confirmed by microscopy in the two countries.

DOTS was implemented by all hospitals in both countries, with the involvement of health centres reaching 65% in Guinea and 92% in Peru. The participation of health posts in the programme activities was minimal in Guinea, but substantial in Peru, where 60% of posts were performing DOTS.

In 1993, the cohort evaluation of 2082 smear-positive cases notified in Guinea and 15 538 smear-positive cases in Peru showed very similar results: 79% of cure/completion rates in Guinea and 85% in Peru. The death rate was 5% in Guinea, where access to health facilities is lower than in Peru and late diagnoses are probably more frequent.

The programme review recommendations in both countries addressed the need to expand the national budgets to cover essential recurrent costs, in particular drugs and laboratory supplies; increase monitoring and supervision of regions and subregions performing below the national average in achieving programme targets; decentralize training for laboratory technicians; and teach national guide-

lines in medical, nursing and technical schools. For Guinea, access to the microscopic examination had to be guaranteed for all the tuberculosis suspects, even those who are unable to travel to the nearest laboratory. The national and regional levels had to explore practical ways of storing specimens, which can either be shipped to the laboratory or picked up by an itinerant collector twice a week. A specific recommendation for Peru was to adjust the retreatment chemotherapy regimen to the WHO/IUATLD guidelines.

Lessons learned and policy implications

Programme review methodology

The programme review methodology has been a useful instrument to secure government commitment, re-orient the control policies, and re-plan the programme activities in countries operating ineffective tuberculosis programmes. Although the speed of implementation varied, depending on local circumstances, there was considerable progress in the efforts made to put DOTS into practice. The programme review methodology was also useful for countries implementing correct control policies, such as Guinea and Peru. The review documented the success of the WHO-sponsored control strategy, reassuring Ministry of Health technicians and managers that the chosen direction was correct. This was an important encouragement to proceed, secure further financial resources, and overcome constraints.

All the programmes were supported by substantial budgetary increases from external and internal sources, which more than covered the cost of the programme reviews (US\$ 20 000–50 000).

The programme review is a complex undertaking that requires detailed planning well in advance of its implementation. The review can not be organized properly in one or two weeks, even in a small country. The WHO *Tuberculosis programme review manual* specifies adequately the steps to be followed (4). It is also very important to organize from the start the follow-up of the implementation of the recommendations.

Alternatives to the WHO-proposed programme review methodology are less effective. National staff have no time and often are not able to undertake a comprehensive appraisal of the problems and profound revision of their programme. Individual consultants cannot cover a wide scope of programme activities at all management levels and in a large number of health facilities and laboratories; their reports reflect their individual views. In contrast, the

Table 5: Quantitative achievements of the tuberculosis control programmes in Guinea and Peru

	Guinea	Peru
<i>No. of microscopy laboratories:</i>		
In 1990	15	425
Programme review year	67	579
Increase	346%	36%
<i>Notification of cases:</i>		
Pulmonary, smear (+ ve)	69%	69%
Pulmonary, smear (– ve)	13%	17%
Pulmonary, no smear	—	5%
Extrapulmonary	18%	9%
<i>Implementation of DOTS:</i>		
No. of hospitals	35	128
Proportion with DOTS	100%	100%
No. of health centres	345	864
Proportion with DOTS	65%	92%
No. of health posts	374	3468
Proportion with DOTS	1%	60%
<i>Treatment outcomes:</i>		
Cure/completion	79%	85%
Defaulters	11%	8%
Deaths	5%	3%

report of a programme review carries the weight of the collective view of a large group of external and national experts.

Programme review participants

The involvement in the programme review of public health and academic institutions, cooperation agencies, NGOs and professional associations helped to secure a broad support for the new control policies. However, an important limitation was the lack of availability of individuals from these institutions for the whole duration of the review. Their presence in the review process, input in the conclusions, and commitment to the recommendations increased the credibility of the reports and facilitated official approval of the new policies.

In many countries national seminars were organized a few months after the programme review to broaden the involvement of leading health professionals in adopting the new control approaches. Some countries established national technical advisory committees to assist the programme in formulating policies and planning and evaluating activities.

The involvement of representatives of cooperating agencies and NGOs (local and external) raised their awareness about the tuberculosis problem and increased their motivation to contribute to the proposed solutions.

Strengthening of managerial activities

Training, supervision, logistics and communication are important managerial activities for implementing

the policy changes that should be clearly defined in the workplans. The choice of correct policies is a necessary but insufficient first step. Technically well-oriented programmes fail if they are unable to translate policies into realities. In programme terms, the managers have to make correct case management (diagnosis and treatment) services accessible to the patients and motivate the patients to make use of them.

In general, the programme review reports and the subsequent workplans defined clearly the managerial activities to make case management accessible to all patients. Programme management was addressed to organizing training for different categories of health workers, as well as supervision and logistics. With a few exceptions, less emphasis was laid on organizing communication or health education activities addressed to enlist patients' participation in using the case management services. There was good justification for the imbalance in emphasis between the three programme activities directed towards increasing access and the one activity directed towards increasing use. The main focus of the first stage of the programme is to ensure that $\geq 85\%$ of patients who attend health facilities because of their symptoms are cured. The principal priority is therefore to provide the means for their proper diagnosis and treatment through well-trained and supervised staff and adequately supplied health facilities and laboratories. At this stage, mass-media communication activities aimed at encouraging individuals with respiratory symptoms to attend health facilities or promoting active case-finding should be strongly discouraged, since it is counterproductive to increase case-finding and stimulate care-seeking if health facilities are not available to provide effective treatment.

However, a necessary activity at any stage of the tuberculosis programme is the counselling or interpersonal communication between health workers and patients to ensure the latter's understanding about the disease and, above all, to foster their compliance with treatment indications, including supplying sputum samples for examination. The success of DOTS requires patients' cooperation. In general, the programme review and the plans of operations did not pay sufficient attention to the messages and the skills for counselling patients. Encouraging experiences in communication activities were reported by the programme review in Nepal.

Involvement of the primary health care structure

Two opposing managerial approaches for tuberculosis control have been implemented in the past: pro-

gramme planning and delivery almost exclusively through specialized facilities; and full integration of programme planning and delivery into the general infrastructure of primary health care services. Both approaches failed to achieve the operational targets and resulted in programmes that performed poorly. The programme reviews illustrated well the failures of these approaches.

The programme reviews also documented the success in Guinea and Peru of an eclectic organization that combined a strong specialized central unit and intermediate supervisory teams with the full participation of primary health care in case-finding and treatment activities. The combined approach requires a firm political commitment to tuberculosis control by the appropriate level of the Ministry of Health. The central unit of the latter, in association with a central laboratory, is responsible for establishing technical guidelines, providing guidance for planning, organizing surveillance, evaluating programme results, and supporting the training, supervision, logistics, and monitoring activities of the intermediate level. All the facilities should participate in identifying tuberculosis suspects and in DOTS implementation; the peripheral health facilities are crucial for increasing access of patients to diagnosis and DOTS, and strengthening patients' compliance.

Monitoring and evaluation

Monitoring and evaluation of case management function well if based on the correct classification of notified cases and quarterly reports on cohorts of patients. The main obstacle to monitoring properly the diagnosis and treatment activities is the lack of information about what is happening at the health facilities. For the notification of cases, the following information is crucial: classification of patients into new and relapsed; smear-positive and smear-negative; and pulmonary and extrapulmonary. This classification was usually incomplete or wrong; in particular, in many countries patients had not been thoroughly interrogated about their history of previous treatment to make the distinction between new and relapsed cases.

Monitoring requires the quarterly analysis of sputum conversion and treatment outcomes in cohorts of patients so that problems can be identified and remedies proposed as soon as they become apparent. One key aspect of the demonstration areas was the testing of the recording and information system for adequate programme monitoring. The experience in these areas showed that the WHO/IUATLD-recommended information system provides a strong basis for an effective monitoring

process and the maintenance of sufficient drug stocks at health facilities.

Medical, nursing and laboratory schools

A comprehensive programme review should cover teaching about tuberculosis in medical and nursing schools, and training on tuberculosis bacteriology in schools for laboratory professionals and technicians.

The WHO *Tuberculosis programme review manual* does not foresee a revision of the teaching of tuberculosis in pre-graduate training schools (4). With the exception of Guinea, the reviews did not refer to pre-service training. While the programmes are introducing changes in case management practices at government health facilities and promoting the same improvements in nonofficial health services (social security, NGOs, private sector), it is logical and highly desirable to enlist the cooperation of such schools in teaching the national guidelines and appropriate techniques for tuberculosis control.

The programme review provides an excellent opportunity to analyse the content of courses and methods used for teaching about tuberculosis and make recommendations for future cooperative activities between GTB and the pre-graduate schools. If national guidelines on prevention and control of tuberculosis are endorsed and taught in such schools, future generations of doctors, nurses, other paramedical staff, and laboratory workers would be better prepared to practice them in their work.

Quality control

Good quality diagnosis and treatment are the essential requirements to transform a programme from the pilot testing to the expansion stage. Quality assurance of tuberculosis case management should be an integral part of programme activities. The quality of diagnosis and treatment is to a great extent related to the quality of in-service training of doctors and nurses at outpatient services and of laboratory technicians. Dissemination of manuals is important, but health workers do not acquire the correct case management or laboratory skills just by having the manuals at hand. Rather, the contents of the manuals should be taught, in theory and in practice, through training courses in such a way that the trainees acquire not only knowledge but also the skills to carry out correct case management, including the recording and reporting system, or perform microscopy correctly when they return to their working place. The knowledge and skills acquired should later be reinforced through supervision and monitoring activities.

Quality control of microscopy has a substantial impact on the success of the programme. The tuber-

culosis programme, probably more than many others, has a long experience in methods of microscopy quality assurance and has developed and refined an effective methodology. However, the programme reviews determined that the quality assurance methodology was applied irregularly or not at all by the national programmes. Therefore, institutionalization of microscopy quality control, i.e. carry it out on a routine basis throughout the health system under the direction of the national tuberculosis reference laboratory, was requested in all the plans of operations issued after the programme reviews.

Private sector

The programme reviews identified that in many countries the private health system plus the social security institutions provide care to a large proportion, in some places more than 50%, of the diagnosed tuberculosis cases. Clearly, under such circumstances, the targets for identification of smear-positive cases (70%) and for cure (85%) cannot be achieved without involvement of the private sector in the national programme. The programme should encourage private and social security clinics to notify cases, follow the national guidelines on case management, and report treatment outcomes.

Collaboration with social security institutions can be facilitated through existing inter-ministerial coordination processes. There are many possibilities for involving in national activities private doctors from private clinics and from health services provided by industries and enterprises. Drugs and bacteriological examinations could be offered free of charge by programmes provided they make the commitment to prescribe only direct observed chemotherapy. Seminars and training courses can be organized sponsored by medical professional associations. The programme guidelines can be published by medical journals and the reprints disseminated widely by professional bodies. Policies and progress made by the programme can be included in the agenda of national medical meetings.

Control of tuberculosis drugs

Brazil provided one of the most interesting findings in the programme reviews. The Ministry of Health supplied, through an agency, tuberculosis drugs, in fixed combinations, regularly and free of charge for more than 15 years to all patients, without exception, in the public, social security, and private sectors. Tuberculosis drugs are not available for purchase in the pharmacies. There were suggestions that the policy of state monopoly over tuberculosis drugs together with the widespread use of isoniazid and

rifampicin in fixed combinations may be the reason why the levels of mycobacterial drug resistance in Brazil are either constant or increasing very slowly compared with the situation in other developing countries.

Tuberculosis programme advocacy

In Thailand the programme review team included an expert in public relations responsible for organizing tuberculosis advocacy activities during the review period. This initiative was taken because the prevailing impression was that the official policy statements did not include tuberculosis among the main priorities for action in the health sector. The mass media reacted well to the programme review initiative and disseminated substantial information on tuberculosis and the programme needs. The experience was positive. Government officials, health professionals, staff of cooperation agencies and NGOs operating in the country became aware of the programme review efforts, findings, and recommendations. Advocacy activities should be considered for inclusion in the WHO *tuberculosis programme review manual*. (4).

Cost analysis and cost-benefits of tuberculosis programmes

Several review teams (Guinea, Indonesia, Thailand and those involving World Bank staff) included economists who produced valuable cost analyses and estimates of the cost-benefits of the new tuberculosis control approach compared with the existing programmes. These estimates were very useful in discussions of the financial requirements for the revised programme with government budget officers and with external cooperation agencies. GTB might consider including the economic analysis as an integral part or at least as an annex of the manual on programme reviews.

Conclusions

The experience with the programme reviews in 12 countries shows that this methodology is able to promote a systematic problem-identification approach by national tuberculosis programmes with the collaboration of national and external experts. The programme review utilizes available data to identify constraints and to arrive at a core of recommendations to re-orient the policies and re-plan the activities. The programme review provides a model for continued programme management using a wide variety of sources of information; the model is useful both for countries that require an overall pro-

gramme reorganization and those that are already implementing correct control policies.

Based on the experience acquired in programme reviews in selected countries over the period 1990–95, this methodology should be recommended to all countries that require substantial programme reorientation; it is also appropriate for carrying out evaluations at 4–5-year intervals in countries that are implementing the correct tuberculosis control policies.

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Résumé

Examen des programmes nationaux de lutte contre la tuberculose: expérience acquise par 12 pays entre 1990 et 1995

Depuis 1990, le programme mondial de lutte contre la tuberculose soutient la révision des programmes nationaux de lutte contre la tuberculose afin de renforcer l'accent mis sur le traitement de brève durée sous surveillance directe (TSD) et le suivi étroit des résultats du traitement. Le programme GTB encourage l'évaluation approfondie des activités au moyen d'un examen complet du programme.

Au cours de la période 1990–1995, l'OMS a financé 12 examens de programme de ce type. Les critères de sélection étaient les suivants : population importante (Bangladesh, Brésil, Chine, Ethiopie, Inde, Indonésie, Mexique et Thaïlande); bonnes perspectives concernant l'élaboration d'un programme type pour une région donnée (Népal, Zimbabwe); ou mise en œuvre, à un stade avancé, d'un programme type pour une région donnée (Guinée, Pérou). L'incidence combinée de la tuberculose pulmonaire à frottis positif était estimée à 82 pour 100 000 personnes, environ 43% de l'incidence mondiale. La prévalence de l'infection par le virus de l'immunodéficience humaine était variable—très élevée en Ethiopie et au Zimbabwe, mais négligeable au Bangladesh, en Chine, au Népal et au Pérou.

Les examens de programmes ont été effectués par des équipes de 15 à 35 experts représentant une vaste gamme d'institutions nationales et extérieures. Après une période préparatoire de deux à trois mois, l'examen durait en général deux à trois

semaines, et comprenait une première phase de réunions avec les autorités et l'examen des documents, une deuxième phase concernant les visites sur le terrain et une troisième phase concernant la discussion des résultats et des recommandations.

A l'exception de la Guinée et du Pérou, le programme a exigé dans les dix autres pays des changements considérables dans les politiques et l'organisation. Les problèmes les plus graves qui ont été rencontrés pourraient être regroupés dans dix grands domaines : domination des services spécialisés par rapport aux soins de santé primaires dans le diagnostic et le traitement des cas; politiques disparates au sein d'un même pays au niveau de la lutte antituberculeuse; accent excessif mis sur la détection des cas au détriment du suivi des malades; valeur trop élevée accordée aux critères radiologiques et cliniques pour le diagnostic; absence de fiabilité de la microscopie; faible taux d'application de la chimiothérapie contre la tuberculose; pénurie fréquente de médicaments antituberculeux; systèmes d'information non reliés au suivi et aux besoins d'évaluation; négligence des fonctions gestionnaires essentielles comme principale source des problèmes identifiés; et renversement ou ralentissement d'une tendance épidémiologique précédemment en baisse comme conséquence des problèmes identifiés.

Lors du suivi des examens de programme, dix pays ont adopté des mesures importantes pour réorganiser leurs propres programmes. Les niveaux central et intermédiaire ont été renforcés; des manuels révisés ont été publiés et des plans de travail solides assortis d'estimations budgétaires réalistes élaborés. Les politiques de l'OMS concernant les TSD ont été adoptées pratiquement sans exception; un financement extérieur important a été obtenu pour le Bangladesh, la Chine, l'Ethiopie, l'Inde, le Népal et le Zimbabwe, et une augmentation considérable des fonds nationaux prévue au Brésil, en Chine, en Inde et en Thaïlande.

En Guinée et au Pérou, l'examen du programme a eu pour but d'évaluer la mise en œuvre des approches actuelles de l'OMS en matière de lutte antituberculeuse alors que le programme venait d'être étendu à l'ensemble du pays avec un degré de réussite remarquable.

Les principales leçons tirées de l'examen programmatique sont énumérées ci-après : l'examen programmatique est un instrument utile pour assurer la participation du gouvernement, réorienter les politiques de lutte antituberculeuse et planifier à nouveau les activités sur des bases solides; la participation des institutions universitaires et de santé publique, des organismes de coopération et

des organisations non gouvernementales a fourni un appui élargi aux nouvelles politiques; le succès du programme est lié à une direction centralisée qui soutient une mise en œuvre décentralisée par l'intermédiaire des services de soins de santé primaires; le suivi et l'évaluation de la prise en charge des cas fonctionnent bien s'ils sont basés sur une classification correcte des cas et des rapports trimestriels sur les cohortes de malades; un examen programmatique complet doit inclure l'enseignement relatif à la tuberculose dans les écoles consacrées aux médecins, au personnel infirmier et au personnel de laboratoire; une bonne qualité du diagnostic et du traitement sont des conditions essentielles pour élargir un programme au-delà des essais pilotes; et les cibles de la lutte antituberculeuse ne peuvent être atteintes si les malades relevant du secteur privé et de la sécurité sociale sont laissés de côté par le programme.

La méthodologie relative à l'examen programmatique complet doit être recommandée à tous les pays qui exigent une réorientation de leurs programmes; elle permet également de procéder à des évaluations à des intervalles de quatre à cinq ans dans les pays qui mettent en œuvre des politiques de lutte antituberculeuse correctes.

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